

THE INVENTION CLAIMED IS:

1. An apparatus comprising:

a programmable logic controller adapted to communicate with a system control computer and at least one electrically controlled valve associated with a semiconductor processing chamber, the programmable logic controller further adapted to:

generate an operation command for the at least one valve; and

transmit the generated operation command to the at least one valve so as to execute the transmitted operation command at the at least one valve;

wherein the generating, transmitting and executing steps are all performed within a time period that does not exceed 10 msec.

2. A system comprising:

at least one electrically controlled valve associated with a semiconductor processing chamber;

a programmable logic controller adapted to communicate with a system control computer and the at least one electrically controlled valve and further adapted to:

generate an operation command for the at least one valve; and

transmit the generated operation command to the at least one valve so as to execute the transmitted operation command at the at least one valve;

wherein the generating, transmitting and executing steps are all performed within a time period that does not exceed 10 msec.

3. The system of claim 2 wherein the programmable logic controller is adapted to communicate with the at least one electrically controlled valve via at least one solid state relay.

4. A system comprising:

a plurality of electrically controlled valves  
associated with a semiconductor processing chamber;

5 a plurality of drivers coupled to the  
plurality of electrically controlled valves;

a plurality of solid state relays coupled to  
the plurality of drivers;

10 a programmable logic controller coupled to  
the plurality of solid state relays adapted to communicate  
with a system control computer and the plurality of  
electrically controlled valves and, for each electrically  
controlled valve, further adapted to:

15 generate an operation command for the  
valve; and

transmit the generated operation command  
to the valve so as to execute the transmitted operation  
command at the valve;

20 wherein the generating, transmitting and  
executing steps are all performed within a time period that  
does not exceed 10 msec.

5. A method of operating a valve associated with  
a semiconductor processing chamber, the method comprising  
25 the steps of:

generating an operation command for the  
valve;

transmitting the generated operation command  
to the valve; and

30 executing the transmitted operation command  
at the valve;

wherein the generating, transmitting and  
executing steps are all performed within a time period that  
does not exceed 10 msec.

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6. The method of claim 5, wherein the executing step includes opening the valve.

7. The method of claim 5, wherein the executing  
5 step includes closing the valve.

8. The method of claim 5, further comprising  
repeating the generating, transmitting and executing steps  
for at least 10 cycles.  
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9. The method of claim 8, wherein the  
generating, transmitting and executing steps are repeated  
for at least 200 cycles.

15 10. A method of operating a valve associated with  
a semiconductor processing chamber, the method comprising  
the steps of:

providing an electrically-controlled valve;  
downloading a process recipe command from a  
20 system control computer to a programmable logic controller;  
repeatedly generating open and close commands  
at the programmable logic controller in accordance with the  
downloaded process recipe command;

transmitting the open and close commands from  
25 the programmable logic controller to the electrically-  
controlled valve; and

repeatedly opening and closing the  
electronically-controlled valve in response to the  
transmitted open and close commands.  
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11. The method of claim 10, further comprising  
flowing a process gas to the semiconductor processing  
chamber in response to the opening of the electrically-  
controlled valve.  
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12. The method of claim 10, further comprising flowing a purge gas to the semiconductor processing chamber in response to the opening of the electrically-controlled valve.

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13. A valve control system for a semiconductor processing chamber, comprising:

a system control computer;

a plurality of valves associated with a

10 processing chamber; and

a programmable logic controller in

communication with the system control computer and adapted

to control the plurality of valves, wherein the programmable

logic controller controls the valves with a refresh time of

15 less than 10 msec.

14. An apparatus comprising:

a programmable logic controller adapted to communicate with a system control computer and at least one  
20 valve associated with a semiconductor processing chamber, the programmable logic controller further adapted to:

generate an operation command for the at least one valve; and

transmit the generated operation command  
25 to the at least one valve so as to execute the transmitted operation command at the at least one valve;

wherein the generating, transmitting and executing steps are all performed within a time period that does not exceed 10 msec.